

Appl. No. 10/617,620

Docket No. RTN-141PUS

Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application:

- 1 1. (Original) A radiator element comprising:  
2 a pair of fin-shaped substrates spaced apart from one another, each having a transition  
3 section and a feed surface;  
4 a balanced symmetrical feed having a pair of radio frequency (RF) feed lines disposed  
5 adjacent to and electromagnetically coupled to a corresponding one of the feed surfaces; and  
6 wherein the pair of radio frequency feed lines forms a signal null point adjacent the  
7 transition sections.
- 1 2. (Original) The radiator element of Claim 1 wherein:  
2 the balanced symmetrical feed further comprises a housing having a plurality of sidewalls  
3 forming a cavity; and  
4 the pair of feed lines are each disposed on a corresponding one of the sidewalls and  
5 comprise a microstrip transmission line.
- 1 3. (Original) The radiator element of Claim 1 wherein the pair of fin-shaped substrates are  
2 disposed to form a tapered slot.
- 1 4. (Original) The radiator element of Claim 1 wherein the balanced symmetrical feed is a raised  
2 balanced symmetrical feed.
- 1 5. (Original) The radiator element of Claim 1 wherein a first one of the pair of radio frequency  
2 feed lines is adapted for receiving a radio frequency signal and a second of one the pair of radio  
3 frequency feed lines is adapted for receiving a radio frequency signal phase shifted by  
4 approximately 180 degrees.
- 1 6. (Original) The radiator element of Claim 1 wherein the pair of substrates are provided from  
2 an electrically conductive material.

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- 1 7. (Original) The radiator element of Claim 6 wherein the pair of substrates comprise copper  
2 plated metal.
- 1 8. (Original) The radiator element of Claim 1 wherein the pair of substrates comprise a  
2 metalized substrate.
- 1 9. (Original) The radiator element of Claim 1 wherein each of the substrates has a height of less  
2 than approximately  $0.25\lambda_L$ , where  $\lambda_L$  refers to the wavelength of the low end of a range of  
3 operating wavelengths.
- 1 10. (Original) The radiator element of Claim 1 further comprising:  
2 a second pair of substrates spaced apart from one another each having a transition section  
3 forming a second tapered slot and having a second feed surface wherein the second pair of  
4 substrates form a plane which is substantially orthogonal to a plane formed by the first pair of  
5 substrates;  
6 wherein the balanced symmetrical feed includes a second pair of radio frequency feed  
7 lines each disposed adjacent to and electromagnetically coupled to the feed surface of one of the  
8 second pair of transitions; and  
9 wherein the second pair of radio frequency feed lines are electromagnetically coupled to  
10 the second feed surfaces adjacent the signal null point.
- 1 11. (Original) The radiator element of Claim 1 wherein each of the feed surfaces has a first  
2 portion in a first plane and a second portion in a second plane, wherein the first plane forms an  
3 angle of from about 91 degrees to about 180 with the second plane.
- 1 12. (Original) The radiator element of Claim 1 wherein the balanced symmetrical feed further  
2 comprises:  
3 a cavity having a plurality of sidewall surfaces and a top surface disposed adjacent the  
4 pair of radio frequency feed lines; and

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5 a pair of transmission feed lines, each disposed adjacent to an opposing corresponding  
6 sidewall surface of said cavity and having a first feed end electromagnetically coupled to a  
7 corresponding one of the pair of radio frequency feed lines.

1 13. (Original) The radiator element of Claim 12 wherein each of the pair of transmission feed  
2 lines further comprise a second feed end; and  
3 the radiator element further comprises a balun having a pair of outputs each coupled to a  
4 corresponding one of the second feed ends of the pair of transmission feed lines.

1 14. (Original) The radiator element of Claim 13 further comprising a pair of amplifiers each  
2 coupled between a corresponding balun output and second feed end of one of the pair of  
3 transmission feed lines.

1 15. (Original) A wideband antenna comprising:  
2 a cavity plate having a first surface and a second opposing surface;  
3 a first plurality of fins disposed on the first surface of the cavity plate spaced apart from  
4 one another forming a first plurality of tapered slots having a feed surface;  
5 a second plurality of fins disposed on the first surface of the cavity plate spaced apart  
6 from one another forming a second plurality of tapered slots, each substantially orthogonal to a  
7 corresponding one of the first plurality of tapered slots and having a feed surface; and  
8 a plurality of balanced symmetrical feed circuits disposed on the first surface, each  
9 having a pair of radio frequency (RF) feed lines electromagnetically coupled to corresponding  
10 ones of the feed surfaces.

1 16. (Original) The wideband antenna of Claim 15 wherein the cavity plate further comprises a  
2 plurality of apertures; and  
3 wherein each of the plurality of balanced symmetrical feed circuits is disposed in a  
4 corresponding one of the plurality of apertures.

1 17. (Original) The wideband antenna of Claim 17 further comprising a connector plate disposed  
2 adjacent the second surface of the cavity plate and having a plurality of connections;

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3 and wherein each of the plurality of balanced symmetrical feed circuits has a plurality of  
4 feed connections each coupled to a corresponding one of the plurality of connector plate  
5 connections.

1 18. (Original) The antenna of Claim 15 wherein each of the fins has a height of less than about  
2 approximately  $0.25\lambda_L$ , where  $\lambda_L$  refers to the wavelength of the low end of a range of operating  
3 wavelengths.

1 19. (Original) The antenna of Claim 15 wherein each of the plurality of balanced symmetrical  
2 feed circuits is a raised feed circuit having a shape which conforms to the feed surfaces of a  
3 corresponding one of the plurality of fins.

1 20. (Original) The antenna of Claim 15 further comprising a plurality of baluns each coupled to  
2 a corresponding RF feed line.

1 21. (Original) The antenna of Claim 20 further comprising a plurality of RF connectors each  
2 coupled to a corresponding one of the plurality of baluns.

1 22. (Original) A method for converting the propagation mode of a waveform from a TEM mode  
2 to a Floquet mode in a notched radiator element, the method comprising:  
3 providing a pair of elements;  
4 providing a balanced symmetrical feed circuit having a pair of radio frequency feed lines;  
5 coupling the pair of radio frequency feed lines to the elements;  
6 feeding the elements with a differential RF signal coupled to each of the pair of radio  
7 frequency feed lines.

1 23. (Original) The method of Claim 22 wherein each of the pair of elements comprises a pair of  
2 substrates each having a transition section and a feed surface and wherein the transition sections  
3 form a tapered notch.

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- 1 24. (Original) The method of Claim 23 wherein each of the substrates has a height of less than  
2 approximately  $0.25\lambda_1$ , where  $\lambda_1$  corresponds to the wavelength of the low end of a range of  
3 operating wavelengths.

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